



# Vetronics Technology Testbed

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# Vetronics Technology Testbed (VTT) Program Overview



## **GOAL**

Improve war fighting capability of  
ground combat vehicle systems

## **APPROACH**

Develop advanced Vetronics technology  
for ground combat vehicles

Integrate into actual vehicle and demonstrate  
functionality

Conduct technology field tests and scout  
mission scenario experiments

Document results and use for future work





# Vetronics Technology Testbed (VTT) Technologies



## **3D AUDIO**

Improve soldier situational awareness by spatializing radio/intercom/WCA in three dimensions

## **SPEECH RECOGNITION**

Improve soldier efficiency by reducing time to input commands

## **INDIRECT VISION DISPLAYS / DRIVE BY WIRE**

Improve survivability by seating driver under armor  
Improve driving ability with displays rather than vision blocks

## **ADVANCED ELECTRONICS ARCHITECTURE**

Improve development/re-use using reference architecture, open standards, APIs

## **EMBEDDED SIMULATION**

Improve war fighting ability through simulated training and mission rehearsal

## **ADVANCED CREW STATION SOLDIER MACHINE INTERFACE**

Improve soldier effectiveness with multi-function displays



# Vetronics Technology Testbed (VTT) Crew Station SMI



Crew Station SMI adapted from Crewman's Associate (CA) Advanced Technology Demonstrator (ATD)

SMI provides crew interface for:

- Command and Control (C2)
- Target Acquisition and Engagement
- Mobility
- System Control and Status
- Digital Map and Routing Planning
- Survivability
- Battlefield Visualization
- Embedded Training and Mission Rehearsal



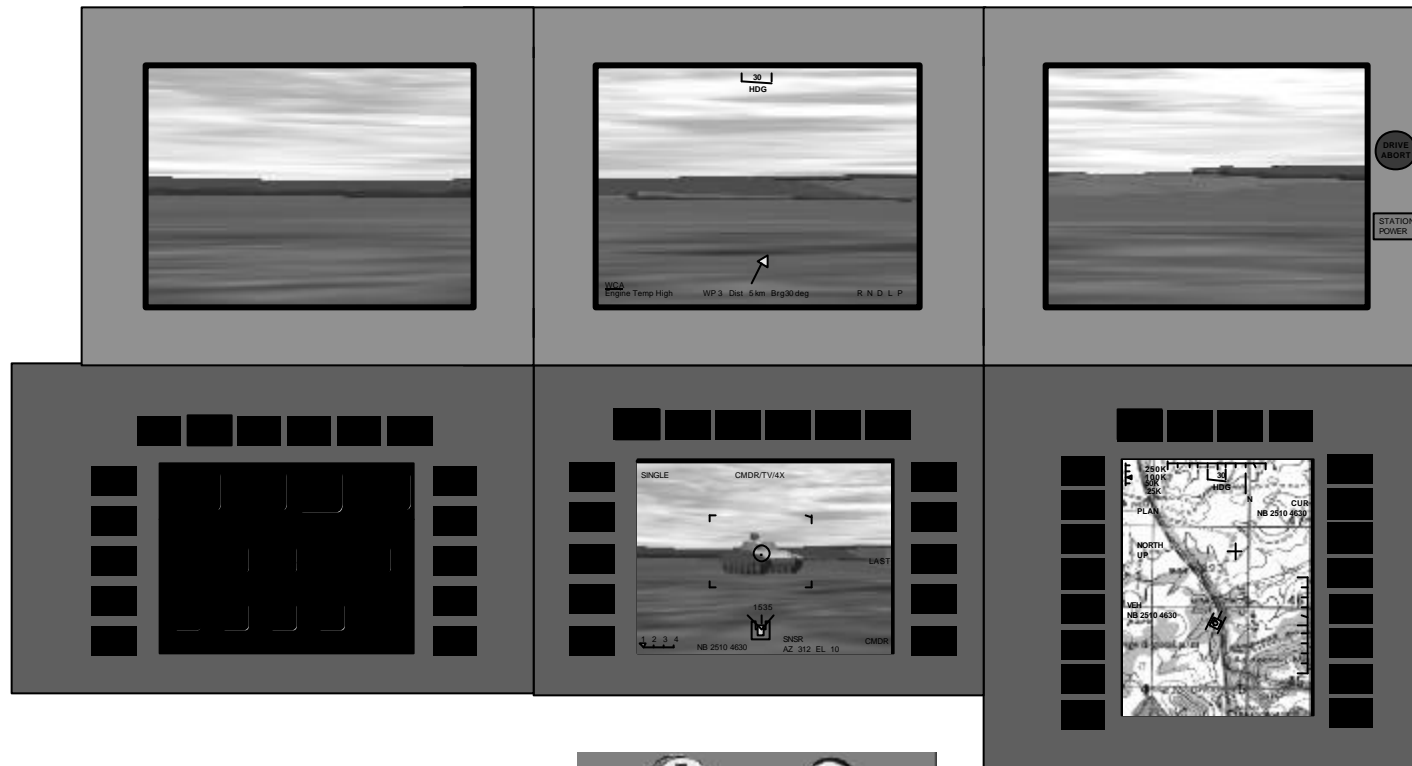
## Key Features

- Multi-Function Displays (MFDs) provides efficient use of hardware
- MFD Touch Screens for easy menu operation
- Bump Cursor allows hands-off menu operation
- Graphics overlay on driving video allows heads up driving
- Adaptable Graphics Interface Library (AGIL) Toolkit for commonality



# Vetronics Technology Testbed (VTT)

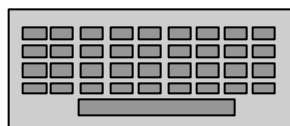
## Crew Station SMI (cont)



IVDs

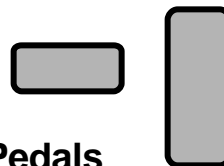
MFDs

Handle



Keyboard

Foot Pedals

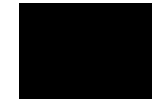
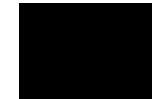
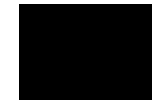
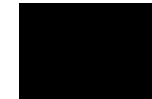
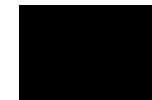
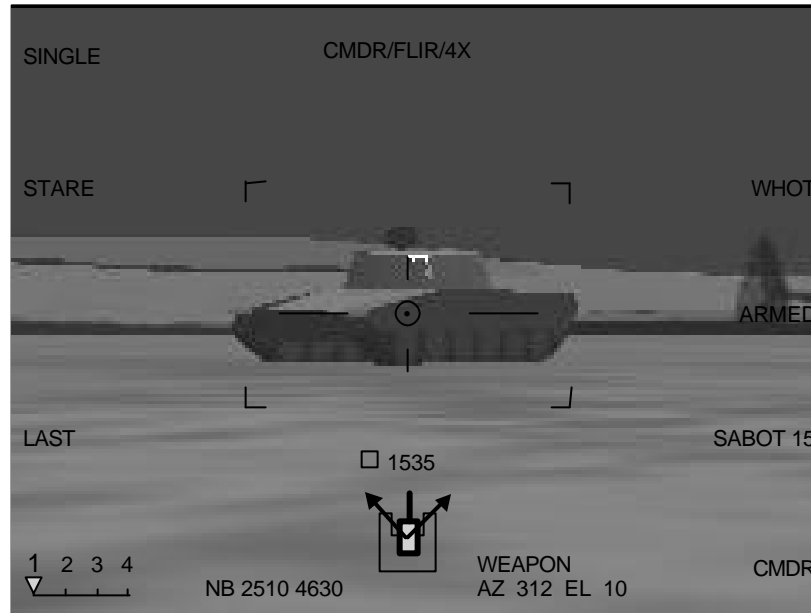
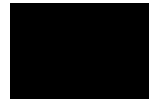
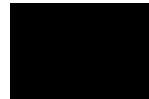
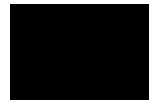
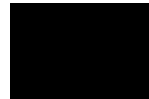
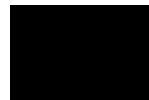


Headset



# Vetronics Technology Testbed (VTT)

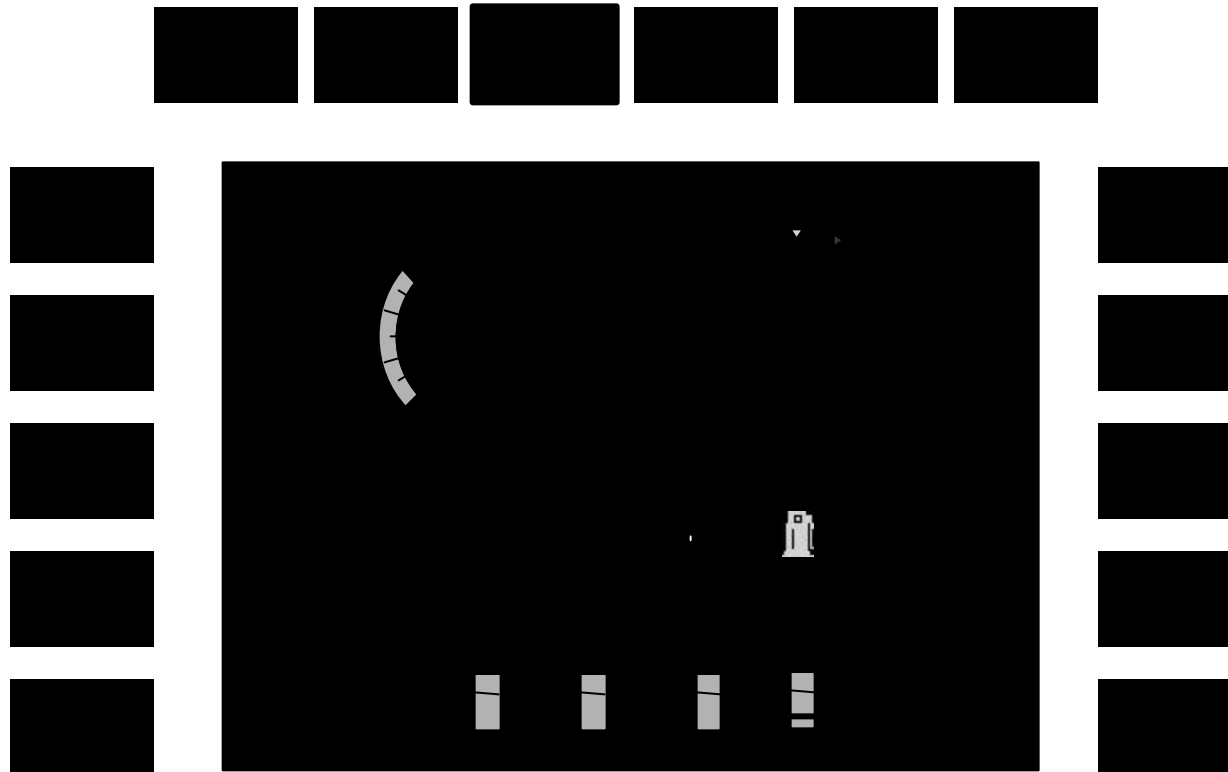
## Target Acquisition Function

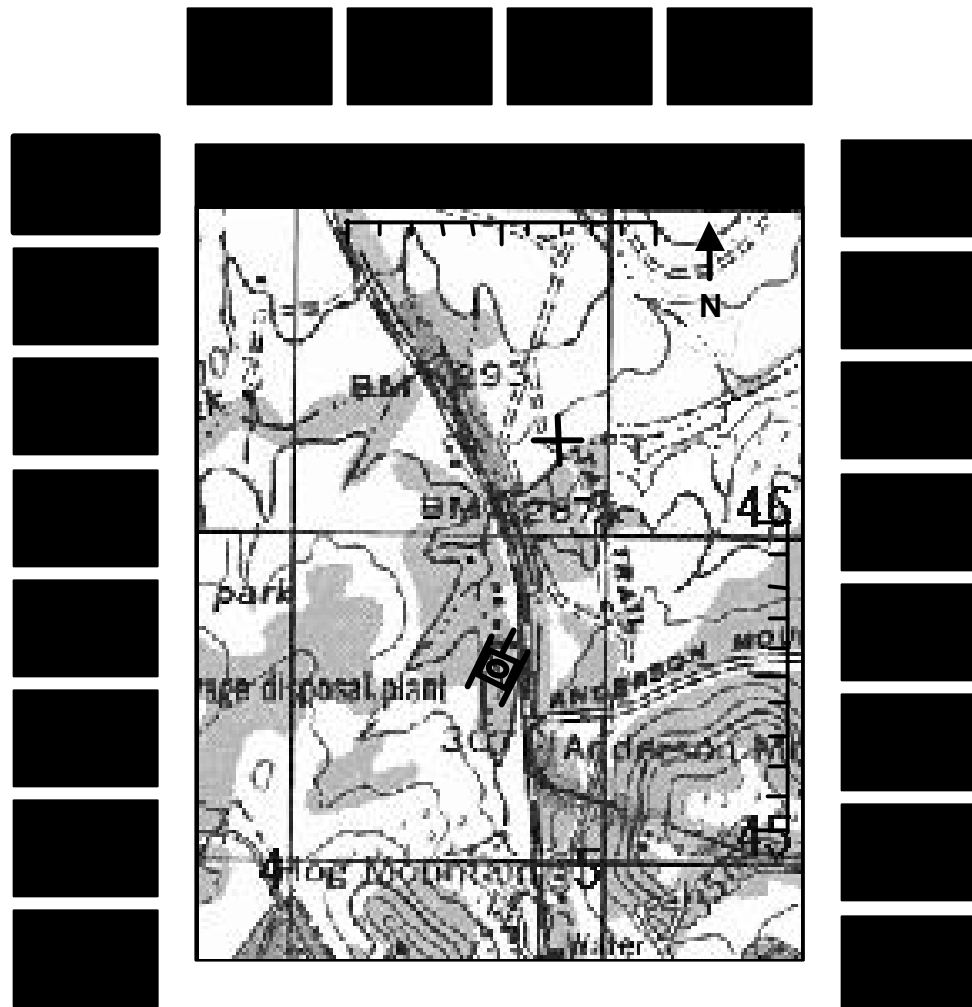




# Vetronics Technology Testbed (VTT)

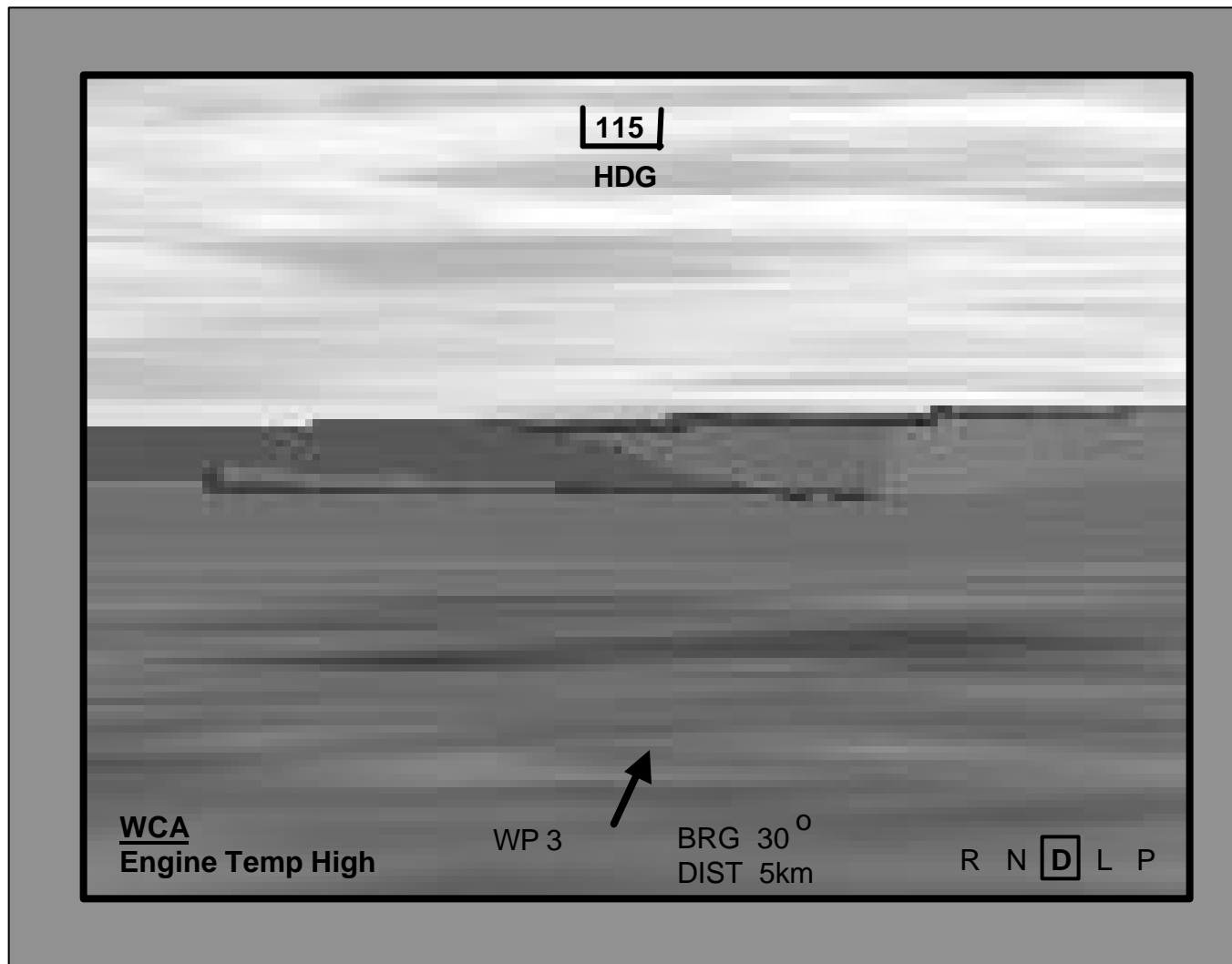
## Mobility Function







# Vetronics Technology Testbed (VTT) Center Driving IVD with Overlay





# Vetronics Technology Testbed (VTT) Integration



## System Integration Lab (SIL)

Laboratory version of entire VTT system using commercial/industrial/mil hardware

Provides hardware integration and software development platform

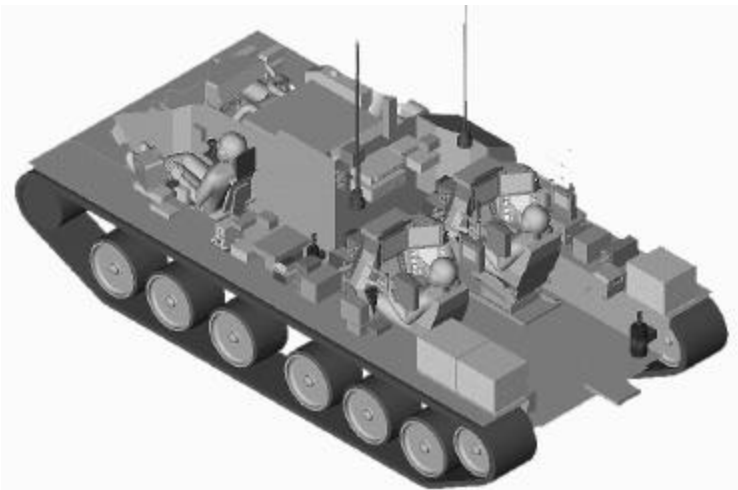
Able to checkout ruggedized hardware before integrating into vehicle

## VTT Vehicle

Ruggedized version of VTT system using commercial/industrial/mil hardware

Bradley M2A0 platform (less turret)

Manned by a crew of three (one soldier at each station plus safety driver)





# **Vetronics Technology Testbed (VTT) Tests and Experiments**



## **Indirect Vision and Drive By Wire Technology Tests June 4-15 2001**

Determine the effects of indirect vision and drive by wire technology while performing various driving tasks:

- Motor Pool Ops
- Tactical Assembly
- Road March
- Vehicle Following
- Tactical Night Driving

Measure visual acuity, time to completion, distance from obstacles, etc.

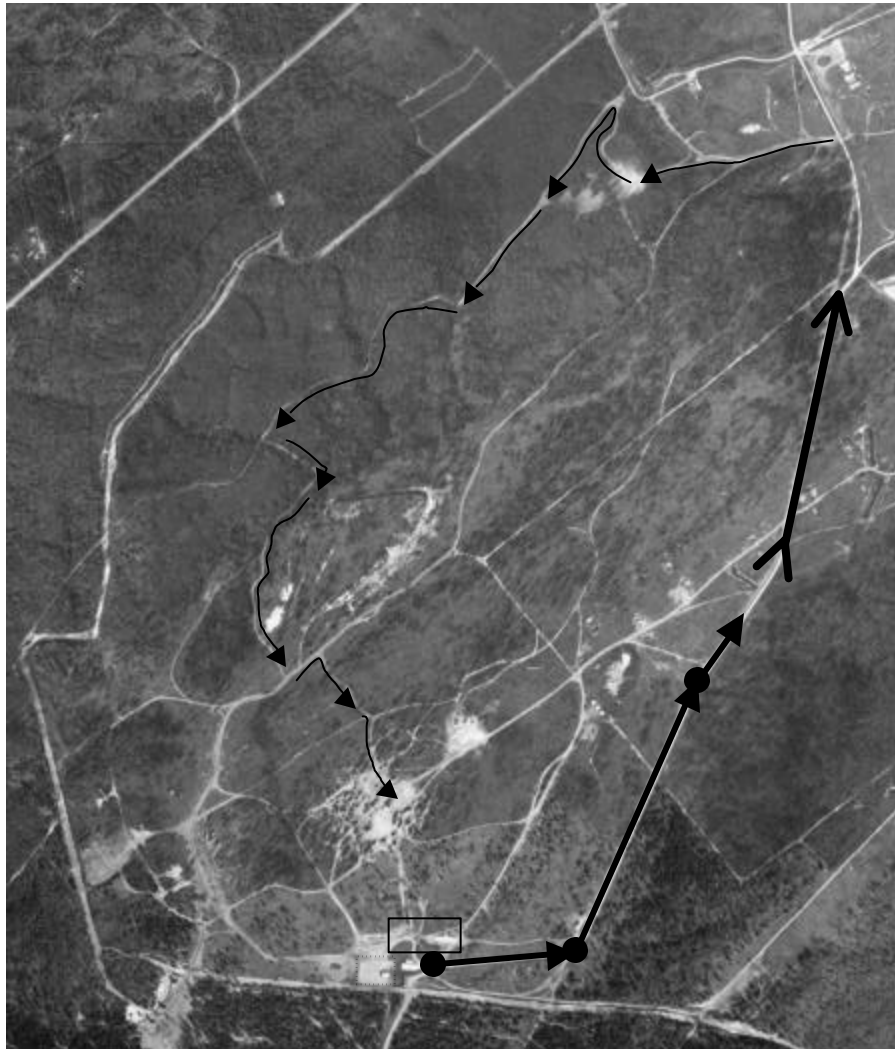
Bradley Fighting Vehicle (BFV) will be used as a baseline



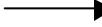


Designed and conducted by US Army Human Research and Engineering Directorate (HRED), Aberdeen Proving Ground, Maryland

Test site is Camp Grayling Military Reservation, Michigan



# Vetronics Technology Testbed (VTT) Tests and Experiments (cont)



-  **Grayling MPRC Support Area**
-  **Slow and Close in Maneuver Area**
-  **Cross Country Driving Test**
-  **Vehicle Following Test**
-  **Road Obstacle Negotiation Test**



# **Vetronics Technology Testbed (VTT)**

## **Tests and Experiments (cont)**



### **Speech Recognition and 3D Audio Technology Tests**

#### **Sept-Oct 2001**

Determine the effects of speech recognition and 3D audio technology while performing multiple crew tasks

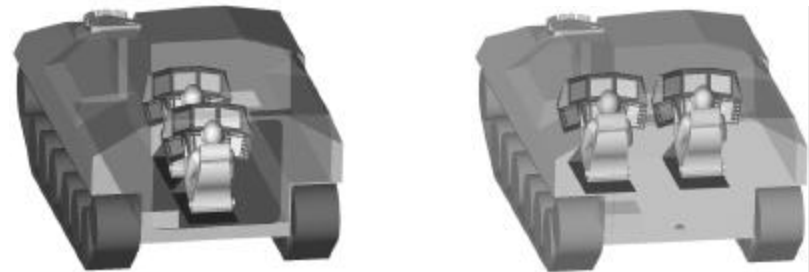
Being designed by US Army Human Research and Engineering Directorate (HRED), Aberdeen Proving Ground, Maryland

### **Scout Mission Scenarios**

#### **Sept-Oct 2001**

Two man crew to conduct military actions while stationary and on the move

Supported by the Mounted Maneuver Battle Lab (MMBL), Fort Knox, Kentucky



Measure human work load while crew conducts various day/night operations  
Raw data consists of video/audio and software data recording

Test site is Camp Grayling Military Reservation, Michigan



# **Vetronics Technology Testbed (VTT)**

## **Lessons Learned and Future Work**



### Lessons Learned

System Integration Lab (SIL) very useful during test and debug (test ruggedized hardware, vehicle cable harnesses, system software, etc.)

SIL uses MIL circular connectors. Need various test harnesses with commercial-mil connectors to test subsystems

Subsystem delivery schedule influenced by a hierarchy of sub-contractors/vendors

Vehicle power distribution system is non-trivial

### Future Work

Continue to develop next generation crew station technology

Investigate helmet mounted displays (HMDs), collision warning systems, ...

Support CAT and RF ATDs with end goal to transfer technology to FCS